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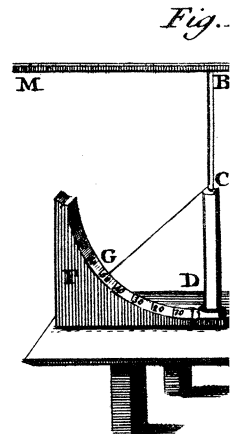
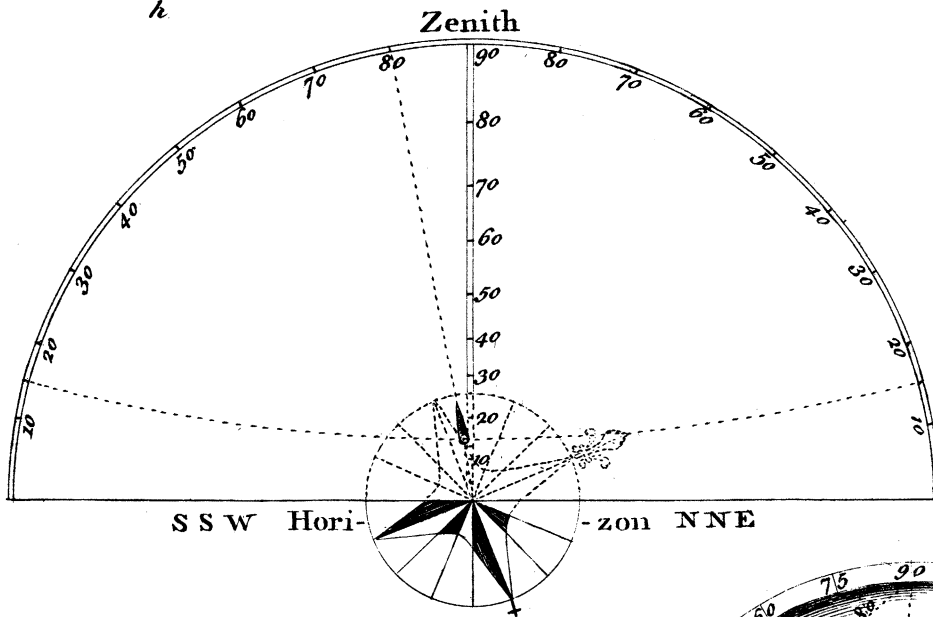
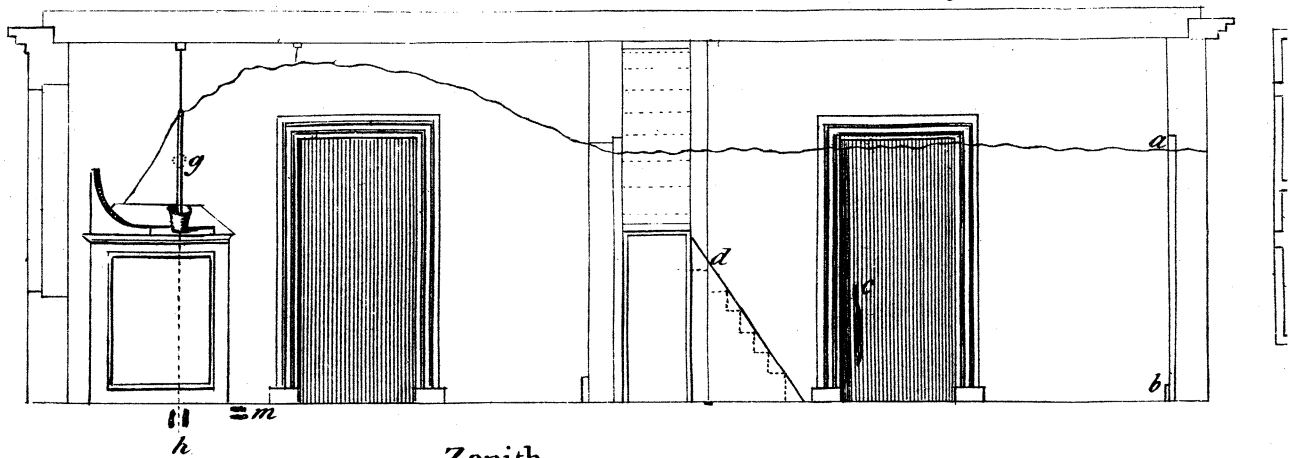


Fig. 3.
p. 775.

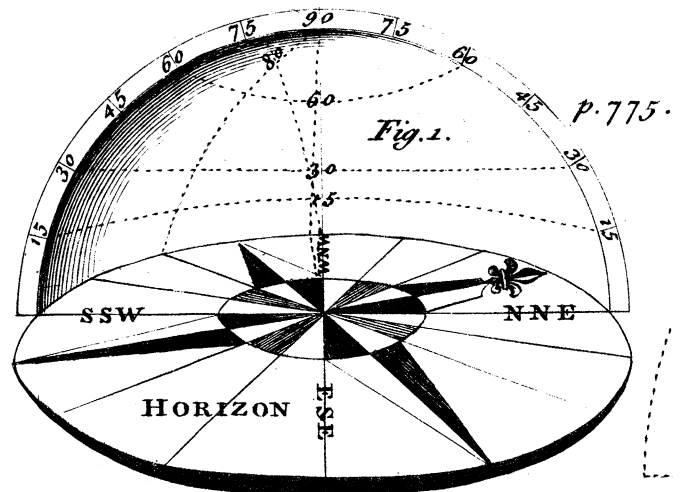


Fig. 2. p.770.

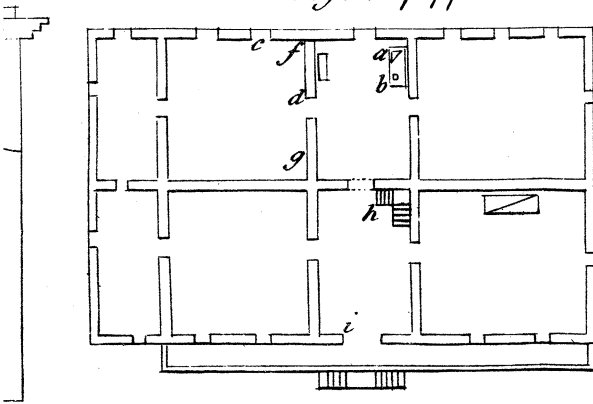
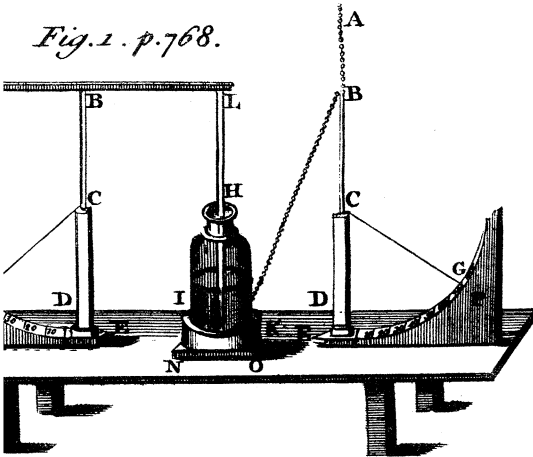


Fig. 1. p.768.



p.775.

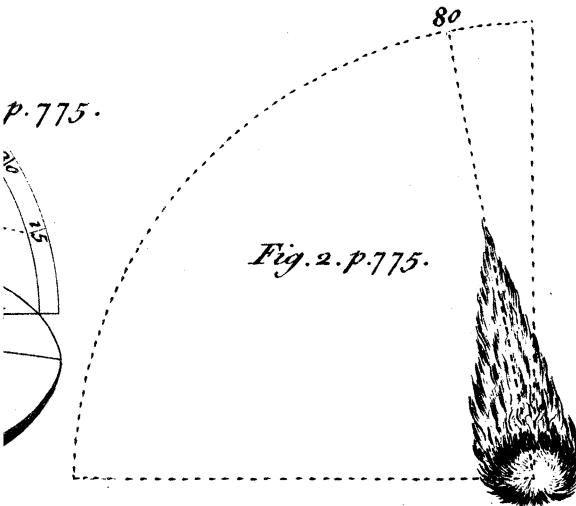


Fig. 2. p.775.

LXXXIX. *An Answer to Dr. Lining's Query relating to the Death of Professor Richman. By Mr. William Watson, F. R. S.*

Read July 4,
1754.

DR. Lining's letter of the 14th of January 1754, being communicated to the Royal Society by Charles Pinckney, Esq; that learned body referred it to Mr. Watson, one of their members, in order that the best information, that could be procured upon this subject, should be transmitted to Dr. Lining, for whose correspondence the Society had for many years had a very particular attention. Mr. Watson imagined, that it would be agreeable to Dr. Lining, as his abode is so remote from Petersburg, where the accident happened, to have transmitted to him not only the answer to what he more particularly requests, but also as general an account of every thing relating to so uncommon an accident, as could be procured.

The description of Professor Richman's apparatus, hereafter mentioned, was sent by himself to Professor Heinius of Leipfic. He intituled it an electrical gnomon. To the construction of this gnomon were necessary a rod of metal, a glass jar, a linen thread of a foot and half in length, to one end of which was fastened half a grain of lead, and a quadrant *. The rod of metal *C D* was placed in the glass vessel *E*, which contained filings of metal. The linen thread *C G* was fastened to the rod at *C*, and, when the apparatus is not electrified, hangs per-

* See the figure annexed, which, with the account of the apparatus, is extracted and translated from a Latin treatise of Professor Winkler, transmitted to the Royal Society from Leipfic.

pendicular thereto. The radius of the quadrant, which was divided into degrees, was two lines more than a foot and half in length. And here must be added an account of the other part of the apparatus, which was to communicate the electricity to the gnomon during a thunder-storm. Through a glass bottle, the bottom of which was perforated, passed an iron rod, which was kept in its place, by means of a cork fitted to the mouth of this bottle, through which cork likewise was inserted the iron rod. A tile was removed from the top of the house; and upon this opening was placed the bottle, supported by the neighbouring tiles, in such manner that one end of the iron rod was not only four or five feet above the top of the house; but the other end, which came through the bottom of the bottle, did no-where touch the tiles, or any other part of the house. To this end of the iron rod was fastened an iron chain, which was conducted into the chamber of Professor Richman, upon electrics *per se*, so as no-where to touch the building. The entrance to this chamber faced the north; and at the south end of it there was a window, near which stood a table four feet in height. Upon this the Professor placed his electrical gnomon, and connected it with the chain, which was brought under the ceiling of the room over this table, and communicated with the apparatus on the top of the house, by means of a wire *BC*, which hung from the chain, and was joined there to *AB*, by the little ring *B*, and communicated with the rod *DC* at *C*. When the iron rod at the top of the house was affected by the thunder, or otherwise suitable condition of the atmosphere, the thread before-mentioned deviated from the perpendicular; as it

would also do, if artificially electrified. The Professor always observed a greater ascent of the thread from artificial electricity than from that from the atmosphere. By the former, he had seen it upon the quadrant describe an angle of above fifty-five degrees, but never above thirty by the latter. In the year 1752, Aug. 9. the apparatus acquired so great a degree of electricity from the atmosphere, that from the end of the rod the electrical flashes might be heard at several feet distance. Under these circumstances, if any one touched the apparatus, they felt a sharp stroke in their hand and arm.

Professor Richman sometimes added to this apparatus a glass bottle of water, after the manner of Professor Muschenbroek *HI*, adapted to a vessel of metal *IK*, which was placed upon glass. The wire from the mouth of the bottle of water *HL*, during the time of the thunder, he caused to communicate with *BC*. From this addition he found the electricity from the atmosphere more vehement than it was without it. This he first observed on May 31, 1753, when the electrical fire exploded with such a force, that it might be heard at the distance of three rooms from the apparatus. On the left hand of the bottle was placed a second electrical gnomon *. When this was made use of, the wire of metal *BC*, and the wire *HL*, were connected with *MBL*, a prime-conductor from an apparatus for artificial electricity; viz. a glass globe, &c. At the same time also, from the chain *AB* was fastened a piece of wire *BK*, which was in contact with the vessel *IK*. By these means, when the electrical machine was put in

* See the figure.

motion, both the electrical gnomons were electrified ; but this went off in a great measure, as soon as the motion of the machine ceased. By this whole apparatus taken together, Professor Richman observed a kind of reciprocation in the effects of electricity : for at first, when the electrical machine was put in motion, both the linen threads CG and CG arose with the degrees of their respective quadrants. If then the wire BC of the right gnomon was touched, the thread CG collapsed to the rod CD ; but the thread on the left side continued diverging as before the touch. Then, if the wire BC of the left gnomon was touched, then in its turn the thread CG at the rod CD of the right gnomon collapsed, and the thread of the right gnomon ascended again. This reciprocation of the ascending and descending of the thread, might be repeated three or four times without exciting the machine anew.

The ingenious and industrious Professor Richman lost his life on the sixth of August 1753, as he was observing, with Mr. Sokolow, engraver to the Royal Academy at Petersburg, the effects of electricity upon his gnomon, during a thunder-storm. As soon as his death was publicly known, it was imagined that the lightning was more particularly directed into his room by the means of his before-mentioned apparatus. Nor, when this affair was more inquired into, did this opinion appear to be ill-founded : for Mr. Sokolow saw that a globe of blue fire, as big as his fist, jumped from the rod of the right gnomon CD , towards the forehead of Professor Richman, who at that instant was, at about a foot's distance from the rod, observing the electrical index. This globe

globe of fire, which struck Professor Richman, was attended with a report as loud as that of a pistol. The metal wire *BC* was broke in pieces; and its fragments, thrown upon Mr. Sokolow's cloaths, did from their heat burn marks of their dimensions thereupon. Half of the glass vessel *E* was broken off, and the filings of metal therein were thrown about the room. From hence it is plain, that the force of the lightning was collected upon the right rod *CD*, which touched the filings of metal in the glass vessel *E*. Upon examining the effects of lightning in the Professor's chamber, they found the door-case split half-through, and the door torn off, and thrown into the chamber. The lightning therefore seems to have continued its course along the chain, conducted under the ceiling of the room; but that it came from the apparatus at the top of the house to the door, and then into the chamber, does not, as far as can be collected, appear.

If indeed it could be ascertained, that the lightning, which was the death of Professor Richman, was collected upon the apparatus, for this reason, because these bodies, at the instant of the lightning, were capable of attracting and retaining the electricity, it would then be in our power sometimes to divert the effects of lightning. But of this fact, more time and longer experience must acquaint us with the truth.

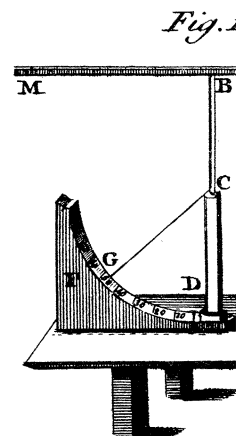
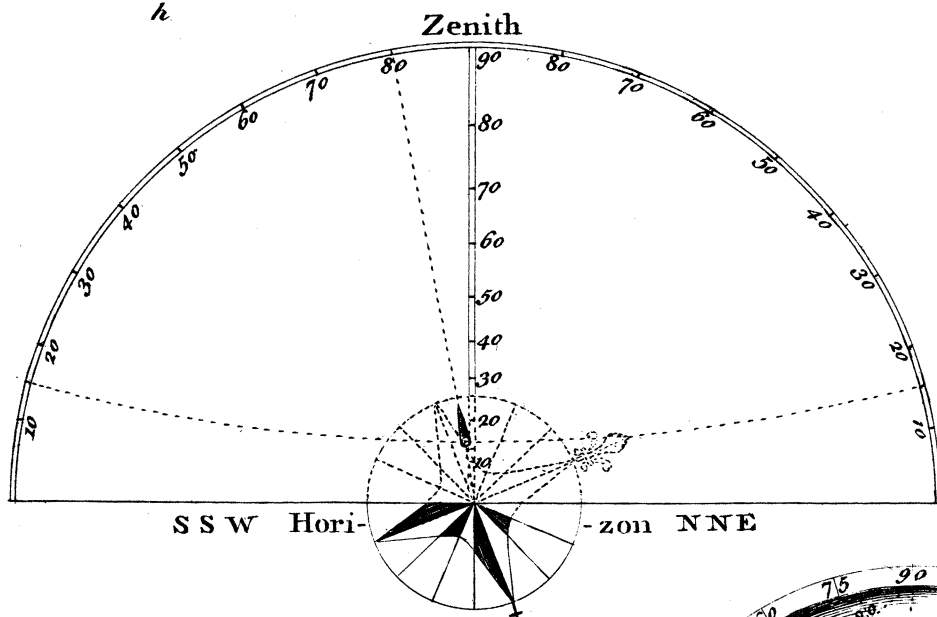
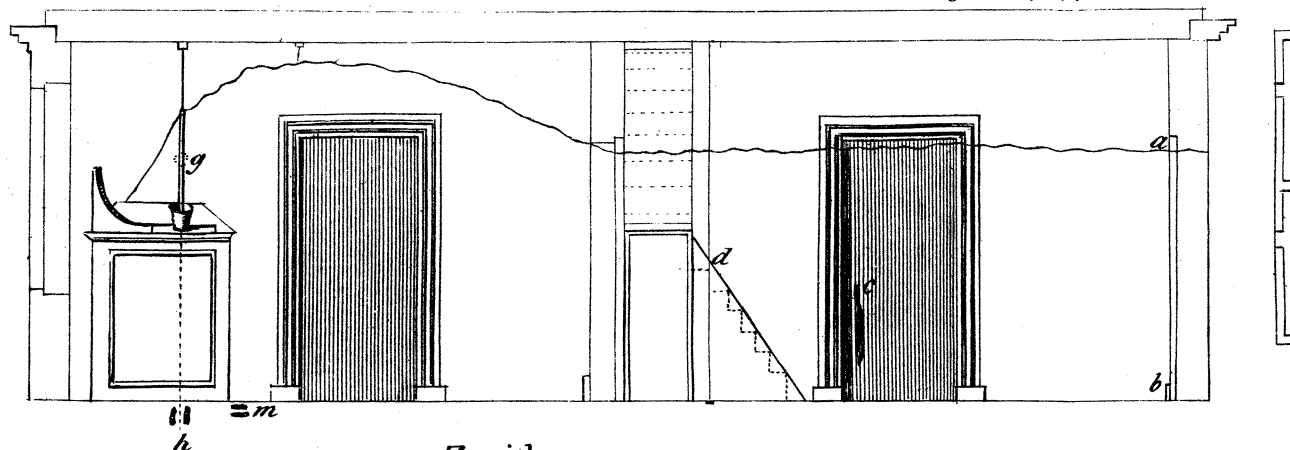
From hence Mr. Pinckney may acquaint Dr. Lining, that, in Mr. Watson's opinion, at the time Professor Richman was killed, his apparatus was perfectly insulated, and had no communication with the earth, by the means of metallic or other substances, readily conducting electricity; and that the

great quantity of electricity, with which, from the vastness of the cause, the apparatus was replete, discharged itself through the Professor's body, being the nearest non-electric substance in contact with the floor, and was unfortunately the cause of his death. This, it is presumed, would not have happened, had the chain, or any other part of the apparatus, touched the floor, whereby the electricity would have been readily communicated to the earth.

Since the reading of the above to the Royal Society, a treatise in Latin, intituled, *Oratio de Meteoris vi electrica ortis*, by Mr. Lomonosow, of the Royal Academy of Sciences at Petersburg, has been transmitted to the Society. By this, among many other curious facts, we have been informed of certain particulars in relation to the death of Professor Richman; of which the following may not be improper to be inserted here.

Mr. Lomonosow observes, that, with regard to the sudden death of the gentleman before-mentioned, the accounts, communicated to the public, contained some circumstances not fairly stated, and others of some importance were entirely omitted. With regard to the first, it is incontestably true, that the window, in the room where Professor Richman was (*a*), had continued shut, that the wind might have no effect upon his electrometer: but that the window in the next room * (*efdg*) was open, and the door (*d*), which was between these two rooms, was half open; so that the draught of air might

* See Tab. XXXI. Fig. 2.



*Fig. 3.
p. 775.*

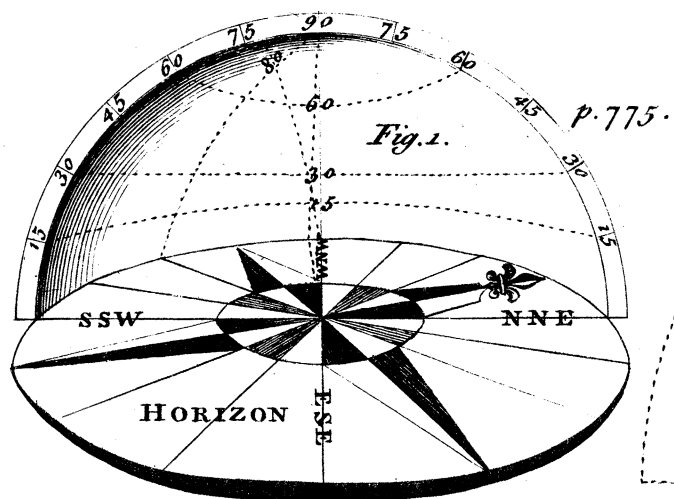


Fig. 2. p. 770.

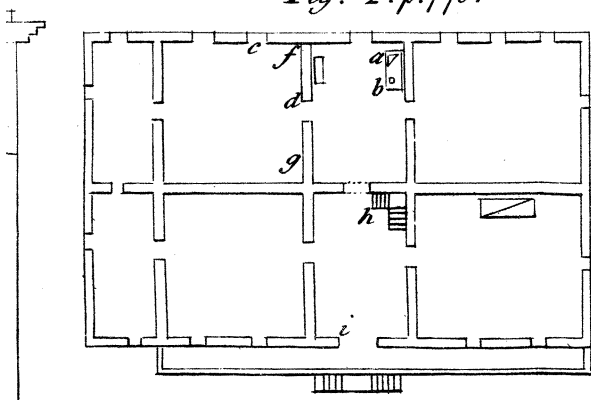
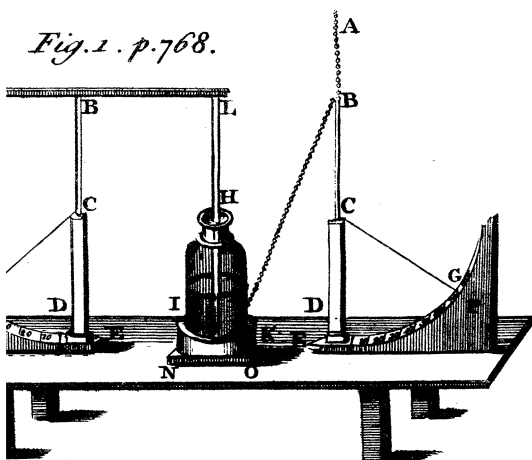


Fig. 1. p. 768.



p. 775.

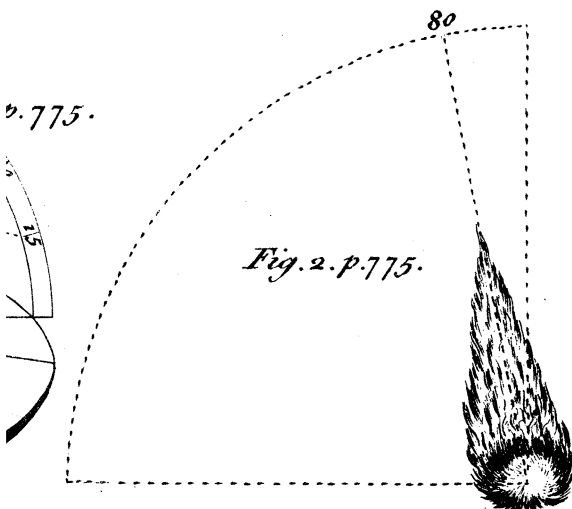


Fig. 2. p. 775.

ustly be suspected to have followed the direction of the iron conductor of the Professor's apparatus: that this conductor came from the top of the house at (*i*), and was continued to (*b*) and (*b*). 2dly, That this conductor was not placed far from that door-case, part of which was torn off. 3dly, That at this time no use was made of the Leyden bottle, mentioned in the preceding account; but the iron was inserted into a glass stand, to prevent the dissipation of the electrical power, and that the gnomon should shew its real strength.

With regard to the second, there has as yet been no mention, that Professor Richman, at the time of his death, had seventy rubles (a silver coin) in his left coat-pocket, which by this accident were not in the least altered. 2dly, That his clock, which stood at (*f*), in the corner of the next room, between the open window and the door, was stopped; and that the ashes from the hearth (*g*) were thrown about the room. 3dly, That many persons without-doors declared their having actually seen the lightning shoot from the cloud to the Professor's apparatus at the top of his house. A view is likewise added * of the chamber, where the Professor was struck by the lightning; who stood at (*b*), with his head projecting towards (*g*) his electrometer; at (*m*) stood Mr. Sokolow the engraver; from the door (*c*) a piece was torn off, and carried to (*d*): (*a b*) part of the door-case rent.

* See Tab. XXXI. Fig. 3.

In this treatise Mr. Lomonosow, among other phænomena of electricity, takes notice, that he once saw, in a storm of thunder and lightning, brushes of electrical fire with a hissing noise, communicate between the iron rod of his apparatus and the side of his window; and that these were three feet in length, and a foot in breadth. Effects like these no one but himself has had the opportunity of observing.

XC. *Extract of a Letter from John Henry Winkler, Professor of Natural Philosophy at Leipzig, and Fellow of the Royal Society, to Thomas Birch, D. D. Secretary of the Royal Society, relating to Two electrical Experiments; translated from the Latin.*

Leipzig, May 22, 1754.

Read July 4, 1754. **I** Transmit to you, Sir, the account of two electrical experiments, both which I made the present year. They are founded upon the famous experiment of Leyden.

On January 8, I sprinkled a plate of metal with the seeds of * club-moss. To this plate I connected a chain, which communicated with the coating of the Leyden bottle of water. I afterwards sufficiently electrified this water to make the artificial thunder,

* *Lycopodium*, Club-moss, Wolf's-claw.